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ABSTRACT

Three 4-week institutes were held, one each in Los Angeles, St. Louis, and Philadelphia, to prepare competent school personnel at the state, county, and district levels to formulate, conduct, and evaluate educational experiments. Participants included teachers, principals, curriculum specialists, research consultants, and superintendents. The institute curriculum covered four broad areas: 1) the research proposal and report, 2) curriculum research and development, 3) curriculum evaluation paradigms and procedures, and 4) techniques for analyzing and interpreting experimental data. Training proceeded primarily by means of a series of instructional packages developed by the Southwest Regional Laboratory as part of their Staff Development Compendium. Followup assistance was also provided to participants. Gains were found between pre- and posttests of participants' knowledge of research methods, and a followup questionnaire showed that 25 percent of the participants had completed and obtained funding for research proposals. (Appendixes contain an outline of participant characteristics, a sample schedule of activities, and responses to the followup questionnaire.) (RT)

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SOUTHWEST REGIONAL LABORATORY
RESEARCH MEMORANDUM

MS1
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EDUCATIONAL INNOVATION: RESEARCH AND EVALUATION TECHNIQUES (REPORT OF 1967 SUMMER INSTITUTES)[1, 2]

I. Significance of the Institutes to Education

The purpose of the three four-week institutes was to prepare competent school personnel at the state, county, and district levels to formulate, conduct, and evaluate educational experiments.

Although most educators are willing to acknowledge the desirability of controlled experimentation in schools, such experimentation is not now and never has been a common school enterprise. Experimental research is widely thought to require a level of statistical and mathematical sophistication beyond that of the typical educator and to demand specialized training in research methodology and techniques outside the

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[1] Participants' stipends and allowances for the three 1967 institutes were supported by a grant from the United States Office of Education, ESEA of 1965, Title IV, Grant No. OEG-1-7-070674-3531. The institutes provided an opportunity for the tryout and evaluation of selected components of the Staff Development Compendium produced under the Staff Training project at the Southwest Regional Laboratory for Educational Research and Development.

[2] Editorial insertions made to original document on 10-27-70

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scope of the typical educational leader's normal training. Training programs for educators, even at the advanced graduate level, convert this thought into an operational obstacle. Thus, it is almost impossible to develop research competence in key school personnel within the framework of existing training programs.

Universities justifiably choose to invest in long-term programs of graduate study. Methodological research training typically follows a long and laborious route in which an attempt is made to render the student a specialist in many fields, including such areas as mathematical statistics, philosophy of science, computer design, and psychometric theory. While these areas indeed have relevance to experimentation on instruction, it is unrealistic to expect people to be both willing and able to complete this kind of program and at the same time prepare themselves to obtain and hold a key school position. Short of this, the only training typically available consists of research methods courses which include discussion of experimentation as one part of the course but do not pretend to develop experimenters.

One obvious solution is for school systems to wait for and recruit the bright, young, long-term graduate student product of the degree program. Unfortunately, instead of being attracted to a school system research position, the well-prepared holder of a research-oriented Ed.D. is likely to be lured into one of the increasingly large number of college and university staff vacancies.

One might suggest that an easy solution would be to hire the competent methodologist as a consultant to work in a cooperative fashion with school people. This is not an optimal arrangement. In several situations where this had been tried, the activities of the two types of personnel closely approximate the parallel play activities of preschoolers; methodologists and school people do manage to work in the same general area but on separate aspects of the problem which are seldom integrated into common action. This is not to say that cooperative activities are not possible and desirable. However, effective cooperation is contingent upon school people learning more about methodology and methodologists learning more about the substantive situation.

The three institutes were designed to prepare key school personnel to formulate, perform, and/or monitor respectable instructional research under natural school conditions. The participants were involved in a concentrated program scheduled over a four-week period. The duration of the institutes was carefully determined to accommodate participants with heavy job responsibilities. Key school people can arrange to be absent for a period of a month without disrupting the continuity of their own programs, but they simply cannot afford the conventional summer-school-length program.

Greater concentration of program over a shorter period of time did not mean, however, that the institute curriculum crammed 15 courses into a single four-week time block. It was not intended that the participants completing the institute would be competent statisticians, psychologists, engineers, or even curriculum specialists. But if they achieved the objectives of the institute, they should be able to formulate, design, propose, conduct, analyze, and report instructional research that will pass the inspection of specialists in each of the areas. There is no question that the participants were still novices in performing experiments; yet most had at least one proposal ready to begin work on by the end of the session. Moreover, as reported in the follow-up study (Appendix D), their experiences in the institute predisposed continued research performance by most of them and insured increased competency with further experience.

An important aspect of the training program was the provision of opportunities for maintaining and extending the skills acquired in the program. Following the conclusion of the research-training institutes, at least two of the regional laboratories conducting them provided continued training and feedback for the participants through a set of follow-up activities designed to assist in formulating and implementing research proposals developed after the institutes.

The institutes gave the participant direct experience in using powerful concepts and procedures basic to school experimentation. At the same time, the participant was able to acquire sufficient sophistication to recognize when he was in need of specialized help. At that point he should be prepared to efficiently obtain the specialized help necessary. Many of the participants who attended have such help readily available either in the person of skilled personnel from the regional laboratories or specialists assigned to their office.

II. Objectives of the Institute

Emphasis during the institutes was placed upon assessing the adequacy of the SWRL-developed materials to provide instructional continuity and yield dramatic gains in researcher performance in the several instructional contexts not directly controlled by Laboratory personnel.

Following are the instructional objectives common to all institute locations and related to the SWRL Staff Development Compendium sequences.

1. Describe operationally the conditions to be met in completing a written proposal for an educational experiment.

2. Distinguish between educational experiments and other forms of professional education endeavors.

3. Define the expected outcomes of learning and instruction in terms of observable learner behavior amendable to empirical investigation.

4. Describe in operational terms the planned classroom transactions for a given curricular program.

5. Specify appropriate independent and dependent variables for an experimental study, and state the specific relationships to be investigated in the study.

6. Select valid and practical experimental designs for investigating specified relationships.

7. Construct and/or select valid criterion instruments to measure the extent to which the desired outcomes of a program have been attained.

8. Perform and/or monitor the experimental operations consistent with the design selected.

9. Select the most appropriate statistical procedures for analyzing the experimental data.

10. Perform and/or monitor the necessary statistical analyses using the most appropriate computing vehicle (emphasis placed on electronic data processing and practice with the accompanying user manual).

11. Interpret the results of an experiment, with special emphasis on the implications for curriculum decisions and further experimentation.

12. Describe the characteristics of a report which presents the results of an experiment in forms suitable for dissemination to various audiences.

III. Number of Trainees and Selection Criteria

Trainees were selected by each of the cosponsoring institutions. Participants were invited to attend the institute serving their particular geographic area. Criteria for geographic and institutional representation were left to the discretion of the cosponsoring agencies. Paragraph 2, Appendix A shows the geographic distribution of the participants in the three locations. Participants were drawn almost exclusively from the regions represented by the respective laboratories.

The general purpose of the institutes necessitated selection criteria which emphasized sampling on a geographic basis from school personnel presently involved in educational leadership positions. Although it was hoped that the general mental ability level would be high, primary consideration was given to the type of position held and the geographic area served.

Priority applicants, in general, held administrative posts in state departments of public instruction, county offices of instruction, or in public or private elementary or secondary school districts. Final selection depended upon the specific nature of their position for the coming year. They were to have major responsibilities such as the formulation and development of federally assisted programs, the operational direction and evaluation of such programs, or the direction of curriculum research and development and/or instruction.

However, the three locations ended up differing somewhat in their selection criteria. Los Angeles selected administrative personnel who were functioning quite directly in curriculum. Philadelphia, on the other hand, chose staff level personnel who were to perform as specialists of one kind or another. Too, almost one-quarter of their group came from the classroom teacher ranks as contrasted with zero in St. Louis and three percent in Los Angeles. The St. Louis group was comprised of high level administrative and staff personnel; sixty percent were either superintendents or principals. Although all participants selected had direct responsibility for curriculum research and development, they differed from location to location in terms of remoteness from the daily operations involved. Appendix A contains data that further describe the several groups of participants.

Within this context additional consideration was given to possession of the following characteristics:

1. general mental ability competitive with the best of the applicants as measured by the Miller Analogies Test.

2. evidence of a maximum number of years of future continued service to professional education judged relative to the norm of the applicants. Final participant selection was the responsibility of each of the regional selection committees.

IV. Program and Materials

The Southwest Regional Laboratory for Educational Research and Development (SWRL) has formally recognized a responsibility for direct involvement in the preparation of educational research and evaluation training materials and procedures. The Staff Training activity is committed to the design and construction of generalizable instructional sequences that can be used by a wide variety of educational personnel.

Instructional Sequences

As indicated a number of "self-contained" instructional sequences, in various stages of formulation and development in the Laboratory, were used. Much of the material which forms the nucleus of the prototype sequences has been tried out by SWRL staff during previous Title IV Research Training Institutes and at workshops on curriculum evaluation held in Minneapolis, Washington, D.C., Santa Barbara, Riverside, Las Vegas, San Diego, and elsewhere.

The Staff Development Compendium is comprised of two categories of sequences. The Curriculum Evaluation sequences were designed to develop the skills necessary for the educational leader to make empirically grounded decisions concerning revision and development of curriculum materials.

The Instructional Research sequences were designed to provide educational personnel with the necessary methodological skills to initiate, conduct, and report experiments in school learning and instruction. Development of these sequences was based on the assumption that controlled experimentation on school learning and instruction is critical and that controlled experiments should actually be conducted in the schools.

The sequences were labeled "self-contained" to reflect that a minimum of staff monitoring should be necessary for instructional success. One of the major objectives was to develop materials and procedures that would be maximally effective under a variety of instructional conditions. The history of this program area suggests that a modular approach to the development of instructional materials and procedures provides more options and permits greater freedom of choice to the instructor. At the same time, the nature of the components helps to insure that continuity is not ignored and student performance is monitored.

Below is a list of the prototype instructional sequences developed in the Laboratory and tried out in this series of institutes.

Prototype Sequences

1. Describing Educational Outcomes
2. Constructing Behavioral Objectives
3. Classifying Educational Research Studies

4. Interpreting Research
5. Improved Educational Programs
6. Types of Instructional Materials
7. Defining Instructional Specifications
8. Management of Behavioral Consequences
9. Measurement of Educational Outcomes
10. Absolute vs Relative Criteria
11. Construction of Prototype Items
12. Educational Criterion Measures
13. Threats to the Validity of a Study
14. Minimizing Threats to the Validity of a Study
15. Design Paradigms and Procedures
16. Use of Library Computer Programs
17. Choosing an Appropriate Statistical Procedure
18. Analyzing Variability
19. A Factorial Model: Rules of Thumb for the ANOVA
20. Formulating the Research Proposal
21. Components of the Research Proposal
22. The Research Report

Management of the Institutes

Since the above sequences have been used previously only in small and/or short tryouts, this series of institutes constituted the first large-scale quality verification cycle. Therefore, the following staffing procedures were followed:

1. One member of the SWRL professional staff was responsible for coordinating all three institutes.

2. One staff member from each of the three regional laboratories represented was responsible for coordinating the respective area institutes.

3. Each of the cooperating regional laboratories supplied the additional staff necessary to monitor and augment the instructional sequences.

4. SWRL provided the necessary professional cadre to accompany certain of the "critical" materials. That is, for those objectives for which sequences had not been completed, or where additional instruction and/or discussion was necessary, SWRL staff was on-site during instruction.

5. In late April 1967, draft copies of the relevant sequences, including user manuals, were delivered to the personnel in the other laboratories who were responsible for instruction at that site.

6. A three-day training session was held in Tempe, Arizona, to insure maximum effectiveness of "package delivery," and to rehearse the roles of the instructors. Following is the schedule followed during the session.

Tuesday, May 23

ORIENTATION

Introduction of Summer Institute Staff

Introduction of Staff Training Personnel

Institute Dates, Location, Personnel

Rationale for SWRL Involvement

Condition of Cooperative Laboratory Involvement

Summer Institute Proposal

ADMINISTRATIVE CONSIDERATIONS

Fiscal Procedures

Personnel Responsibilities

Physical Facilities, Equipment and Supply Requirements

Institute Libraries

Pre-Institute Orientation Packet

Wednesday, May 24

CURRICULUM CONSIDERATIONS

Objectives

Instructional Sequence Breakdown

Tentative Curriculum Schedule

INSTRUCTIONAL USE OF THE SEQUENCES

Self-Contained Sequences

User's Manual

SEQUENCE DESCRIPTIONS AND DISCUSSION

INDIVIDUAL LABORATORY PLANNING

Thursday, May 25

PACKAGE DESCRIPTION AND DISCUSSION

EVALUATION CONSIDERATIONS

Participant Data

Evaluation Instruments

Staff Evaluation

Monitoring and Feedback Procedures

Follow-Up Procedures

Fiscal Accounting

Final Report

V. Description of Activities

Schedule

The institutes had scheduled activities from 8 to 11:30 a.m. and 1 to 4 p.m. Monday through Friday. In general, the morning sessions were devoted to full-group work on the current sequences and related lecture-demonstration-discussion. The afternoon sessions were usually devoted to small group consultation with individual staff members, completing assigned criterion exercises to demonstrate mastery of the sequence objectives considered in the morning session, and individual study. It was hoped that by building "free" individual study into the daily schedule the pacing problems associated with self-contained packages would be minimized.

One can rather artifically divide the objectives and content into four conventional categories (numbers in parenthesis refer to the objectives listed in Section II):

1. The research proposal and report. (1, 12)

2. Curriculum research and development. (2, 3, 4, 5)

3. Curriculum evaluation paradigms and procedures. (6, 7, 8)

4. Techniques for analyzing and interpreting experimental data. (9, 10, 11)

To capitalize on the interrelatedness of the content and objectives, the materials were introduced more or less according to the order shown in pages 6 and 7. To provide for the needed flexibility in programming, the actual schedule was formalized each Friday for the subsequent week. Sample institute schedules are shown in Appendix B.

University Course Credit

With the exception of California, arrangements were made by the cooperating regional laboratories to jointly sponsor their respective institutes with a local college or university. Participants were optionally permitted to enroll in the graduate college for four semester hours of graduate credit. This was block credit, rather than credit for separate aspects of the institutes. The institute in California was cosponsored by the Los Angeles City School System, thus no credit was opted for.

Description of the Sequences

The institutes were concerned with talking about research and experimentation, but with developing competency to do it. The materials were designed and arranged so that the participant was able to monitor his own performance. Each sequence contained expository material that directed his progress. Some sequences contained all of the instructional material, while others from time to time directed the student to read an article or book not found in the sequence. In any case, common to all packages was a series of carefully sequenced exercises designed to cover each aspect of the relevant objective being considered. Every effort was made to minimize the "busywork" and the mechanical aspects of each exercise, and at the same time insure their relevance to the natural school situation.

Mastery Exercises

In addition to the enroute series of exercises described above, an "off-line" exercise covering the objectives met by each sequence was administered to the student. These were reasonably psychometrically adequate criterion instruments used to measure the intended outcomes. Too, they were used to tie performance back into the instructional transactions and antecedents for revision of materials.

Small Group Consultation

Although handled differently at each location, it was anticipated that there would be some communality of interest and problems among the participants which could be handled most efficiently via small group sessions, aided by individual staff members. The groups were to be "open-ended" and highly fluid. The emphasis was to be placed on problem solving rather than group dynamics. As quickly as relevant aspects of the situation were explored and exhausted, a given group was to be dissolved and the participants would go on to something else. Although a certain amount of this actually took place, the bulk of this time was directed to specific objective-related lectures and discussions.

Individualized Study

Participants were encouraged to pursue aspects of the institute in which they become individually interested. While it was clearly stated that the institute objectives were to be achieved by each participant, the staff was to make every effort to stimulate additional efforts. In the past our institute participants have been sufficiently motivated to engage in this kind of activity during their off hours.

Follow-Up Activities

Two types of follow-up activities were planned. First, the cooperating regional laboratories were to establish and maintain a research monitoring service for institute participants. This service enabled participants to utilize certain of the available laboratory technical resources in designing current and future research projects and in analyzing evaluation data. Research for Better Schools utilized this type of strategy. Second, the instructional materials developed for research-training use by the laboratories and all other relevant research and evaluation materials circulated within the laboratories would be routinely mailed to participants after the conclusion of the institutes. These activities should have enabled participants to maintain and extend their research and evaluation skills on an individualized basis. Unfortunately, only limited distribution was made due to lack of funds and the ambiguity surrounding copyright law interpretations.

VI. Summary

The three institutes successfully demonstrated the:

1. efficacy of the modular, "self-contained" approach to packaging instruction.

2. flexibility of the modules to accommodate unique user interests and requirements.

3. adaptability of the sequences to varied levels of user and instructor sophistication.

4. utility of the sequences as a post-institute reference library.

5. power of the sequences to promote continuous meaningful dialogue about practical problems while maintaining necessary instructional continuity.

6. feasibility of managing instruction by objectives, assuming a defined instructional system.

7. importance of carefully specifying and conducting instructor training prior to such institutes.

Participant Test Performance Results

Items on the criterion referenced tests sampled heavily from "terminal objective" type R. & D. situtations. Thus performance gains made were toward the higher levels of difficulty in terms of application of the concepts and techniques to "natural" research settings.

The objectives treated during the institutes constituted a formidable list for participant mastery during a four-week period. However, the performance profiles for the three institutes illustrate dramatic gains for all four objectives clusters. Tables I, II, and III show pre and posttest results for each institute location. The scores are expressed as percentage of items correct for each cluster of objectives.

Table I

*Group Profile for Los Angeles: Median Scores (percentage) for Pre and Posttest, by Objectives Cluster

Cluster	Content	Percentage Pre	Percentage Post
1	Research Proposal and Report (1, 12)**	64	73
2	Research and Development Strategies (2, 3, 4, 5)	61	74
3	Evaluation Paradigms/Procedures (6, 7, 8)	48	67
4	Analyzing and Interpreting Data (9, 10, 11)	27	64

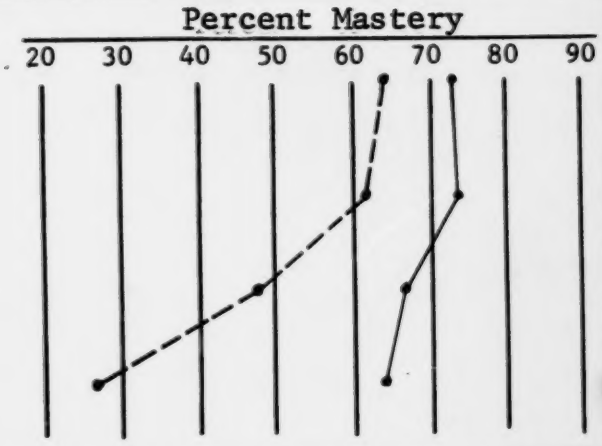


Table II

*Group Profile for Philadelphia: Median Scores (percentage) for Pre and Posttest, by Objectives Cluster

Cluster	Content	Percentage Pre	Percentage Post
1	Research Proposal and Report (1, 12)**	52	65
2	Research and Development Strategies (2, 3, 4, 5)	55	73
3	Evaluation Paradigms/Procedures (6, 7, 8)	44	68
4	Analyzing and Interpreting Data (9, 10, 11)	35	64

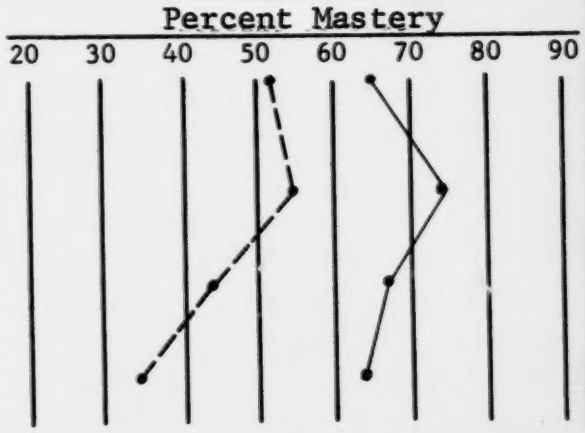
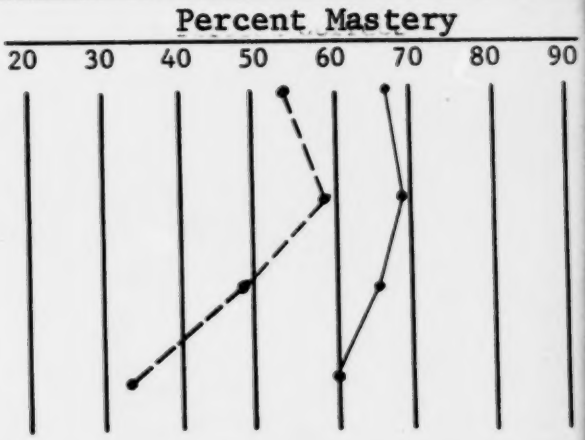


Table III

*Group Profile for St. Louis: Median Scores (percentage) for Pre and Posttest, by Objectives Cluster

Cluster	Content	Percentage Pre	Percentage Post
1	Research Proposal and Report (1, 12)**	54	67
2	Research and Development Strategies (2, 3, 4, 5)	59	69
3	Evaluating Paradigms/Procedures (6, 7, 8)	49	67
4	Analyzing and Interpreting Data (9, 10, 11)	33	60



* dotted line relates to pretest results; solid relate to posttest results

** numbers in ( ) refer to the objectives described under section II of the report

In addition to the posttest, participants were asked to respond to a series of seven-point scales made up of six bi-polar continua for each instructional sequence. Appendix C shows the combined results for each instructional sequence, expressed in terms of the percentage of total responses. The instructional sequences were quite favorably received.

Albeit, many of the items on the criterion tests proved very difficult, requiring extension of acquired skills to "out-of-institute" research settings. However, the tests were designed to assess the full range of "criterion" performance without regard for instructional constraints. Trade-offs always have to be made in such situations. If the instructional goal (in say a four-week workshop) is to maximize performance on criterion referenced tests, then one must structure the environment giving full attention to three obvious problem areas:

- heterogeneity of participants
  - level of entry skills
  - areas of interest
  - job requirements
- artificiality of an academic setting
- possible mismatch between outcomes, performance standards, and the reality of the time frame.

These institutes suggest that effective management of instruction by objectives is possible under a fairly tolerant range of if - then statements. The critical aspect is to clearly specify the "if" side of the statements so that an adequate analysis of consequences for the "then" side may be completed and translated into instruction.

For example, if the three instututes singular goal was to maximize achievement of the 12 aformentioned Compendium objectives, as measured by the criterion referenced tests, then, the instructional conditions must:

- homogenize the participants in terms of entry skills, interests, and job expectations.
- provide a monitoring strategy for the control of enroute mastery of concepts and skills.
- develop a mechanism within the institute setting for applying skills and concepts to real-time problems familiar to the participants.
- provide techniques for monitoring the transfer of acquired skills to participants' own research setting.

If, on the other hand, there are other objectives, then they must be specified and their consequences for instruction analyzed. Those who plan to engage in future training activities should be aware of the significance of the above, particularly if they are going to be held accountable for specified outcomes.

Follow-up

On December 4, 1957, a follow-up questionnaire was mailed to the participants of all three institutes. Appendix D contains the summary of the data collected. Of the 86 mailed, 68 were completed and returned in time for analysis. Highlights of the returns are:

1. Thirty-seven percent of the participants are presently (1967-68) engaged in greater than half-time research and evaluation activities, as opposed to only 14 percent during 1966-67.

2. Over one-quarter of the 1967-68 activities were related to curriculum evaluation.

3. Twenty-five percent of the responding participants actually completed the proposal they initiated during the institute and have received financial support for the conduct of the activity.

4. When asked to indicate those institute materials to which they have referred frequently subsequent to the institutes, the following resulted:

   a. behavioral objectives — 52 percent

   b. research proposal — 34 percent

   c. research report — 33 percent

5. However, 64 percent of the participants reported that all of the materials have assisted them "very much" with their post-institute activities.

6. Twenty-two percent of the respondents reported that they have changed positions since the institute; almost all of them reported that attending the institute was instrumental to the change.

VI. Participating Staff

A. University of Pennsylvania (July 10-August 4, 1967)

Robert L. Baker, Southwest Regional Laboratory

Gerald Chalmers, Research for Better Schools

Robert Fried, University of Pennsylvania

Thor Krogh, Research for Better Schools

Fred Pyrczak, Research for Better Schools

B. Lindenwood College, Missouri (June 26-July 22, 1967)

Robert Berger, Southwest Regional Laboratory

Edwin Bridges, Washington University

Robert Elsea, Washington University

Earl Morris, Central Midwestern Regional Educational Laboratory

Howard Russell, Central Midwestern Regional Educational Laboratory

Donald Thompsen, Central Midwestern Regional Educational Laboratory

C. Inglewood, California (July 5-August 1, 1967)

Larry Harty, Southwest Regional Laboratory

Bruce Monroe, Southwest Regional Laboratory

Carolyn Owen, Southwest Regional Laboratory

Carolyn Wilkerson, Southwest Regional Laboratory

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APPENDIX A

Educational Innovation: Research and Evaluation Techniques

Description of the Participants

1. How many applications were received?

	Received	Qualified	Accepted	Completed
Los Angeles	97	65	31	31
Philadelphia	100	47	29	29
St. Louis	60	52	26	25
	257	164	86	85

2. What geographical areas were represented?

Los Angeles	3 states and Washington, D.C.
Philadelphia	7 states
St. Louis	5 states
	15 states and Washington, D.C.

3. How old were the participants?

	Average age	Range
Los Angeles	38	26-64
Philadelphia	40	23-61
St. Louis	43	31-62

4. Were both sexes represented?

	Male	%	Female	%
Los Angeles	25	81	6	19
Philadelphia	20	69	9	31
St. Louis	23	88	3	12
	68	79	18	21

5. What educational level did they represent?

	BA	MA	Ed.S.	Ph.D.
Los Angeles	4	16	3	8
Philadelphia	6	21	0	2
St. Louis	2	24	0	0
	12	61	3	10

6. What were the Miller Analogies Test raw scores?

	Mean*	Range
Los Angeles	54	29-90
Philadelphia	62	32-92
St. Louis	48	23-88

7. What were present primary job responsibilities?

	L.A.	Phil.	St. Louis	No.	%
a. Principal	6	1	9	16	19
b. Research associate/ consultant	9	3	1	13	15
c. Curriculum supervisor	2	9	1	12	14
d. Director of research/ evaluation	4	2	5	11	13
e. Superintendent	2	0	7	9	10
f. Director of curriculum	4	2	3	9	10
g. Classroom teacher	2	6	0	8	9
h. Director of personnel	1	2	0	3	3
i. Assistant superintendent	1	1	0	3	3
j. College professor	0	2	0	2	2
k. Librarian	0	1	0	1	1
	31	29	26	86	100

*A raw score of 53 is at the fiftieth percentile for entering graduate students in educational administration.

8. What percentage of time do they spend in research and evaluation activities?

Percentage	1966-67 L.A.	Phil.	St.L.	Total No.	%	1967-68* L.A.	Phil.	St.L.	Total No.	%
90-100	2	6	0	8	9	4	10	1	15	18
80-89	1	0	0	1	1	1	0	0	1	1
70-79	0	1	0	1	1	1	1	1	3	3
60-69	0	0	0	0	0	0	0	0	0	0
50-59	2	2	0	4	5	9	8	6	23	27
40-49	0	0	0	0	0	0	0	1	1	1
30-39	1	0	0	1	1	2	0	1	3	3
20-29	5	2	2	9	10	6	3	10	19	23
10-19	5	4	8	17	20	6	0	4	10	11
0-9	15	14	16	45	52	2	77	2	11	13
	31	29	26	86	100	31	29	26	86	100

9. What are their primary research interests?

	Location L.A.	Phil.	St. Louis	Total No.	%
a. Instructional procedures	12	8	8	28	32
b. Federal project evaluation	8	4	2	14	16
c. Administration	5	2	6	13	15
d. Reading	4	4	5	13	15
e. Attitudes/motivation	2	4	1	7	8
f. Teacher education	0	4	0	4	5
g. Compensatory education	0	0	4	4	5
h. Vocational education	0	3	0	3	4
	31	29	26	86	100

*From Follow-Up Study summarized in Appendix D.

APPENDIX B

Sample Schedules of Activities

Week 1

	Period 1 8:30-10:00	Period 2 10:15-11:45	Period 3 1:15-2:45	Period 4 3:00-4:45
Monday	Welcome Announcements Program Overview	Program Pretests	Constructing the Proposal	Personal Affairs
Tuesday	Pre-Design Considerations: Types of Studies and Variables		Discussion: Analysis of participants' projects in terms of sessions 5 and 6	Open Lab
Wednesday	Pre-Design Considerations: Describing Educational or Treatment Outcomes		Discussion: Relevance of sessions 9 and 10 to participants' projects	Open Lab
Thursday	Constructing the Proposal	Types of Instructional Materials	Discussion	Open Lab
Friday	Pre-Design Considerations: Constructing Statements of Outcomes		Discussion	Open Lab

Week 2

	Period 1 8:30-10:00	Period 2 10:15-11:45	Period 3 1:15-2:45	Period 4 3:00-4:45
Monday	Pre-Design Considerations: Measuring Educational Outcomes		Discussion: Analysis of criterion measures defined by participants in their projects	Open Lab
Tuesday	Defining Instructional Specifications	Designing the Experiment: Threats to Validity	Discussion	Open Lab
Wednesday	Designing the Experiment: Minimizing Threats to Validity		Discussion: Relevance of validity threats to participant projects	Open Lab
Thursday	Designing the Experiment: Paradigms and Procedures		Discussion	Open Lab
Friday	Designing the Experiment: Situational Exercises		Open Lab	

Week 3

	Period 1 8:30-10:00	Period 2 10:15-11:45	Period 3 1:15-2:45	Period 4 3:00-4:45
Monday	Analyzing the Data		Discussion	Open Lab
Tuesday	Selecting a Statistical Technique		Disucssion	Open Lab
Wednesday	Constructing the Proposal		Open Lab	
Thursday	Project Budgeting	Analyzing Variability: A unifactor model	Discussion	Open Lab
Friday	Use of Library Computer Programs		Open Lab	

Week 4

	Period 1 8:30-10:00	Period 2 10:15-11:45	Period 3 1:15-2:45	Period 4 3:00-4:45
Monday	Experimental Operations and Procedures	Conditions of Learning	Discussion	Open Lab
Tuesday	Analyzing Variability		Discussion	Open Lab
Wednesday	Controlling the Subjects' Behavior (contingency management, external and internal controls)		Open Lab	
Thursday	Writing the Research Report		Open Lab	
Friday	Posttests		Feedback on Posttests and Wrap-up	Check-out

APPENDIX C

Percentage of Participants Responding to
Each Category, by Rating Dimension and Instructional Sequence

1. Describing Educational Outcomes

useful	36	27	17	15	4	3	0	useless
confusing	0	13	15	20	13	28	10	clear
orderly	24	30	15	13	17	0	0	chaotic
incomplete	0	7	2	20	20	30	22	complete
convenient	19	30	16	19	9	7	0	inconvenient
complex	0	24	24	30	11	7	4	simple

2. Constructing Behavioral Objectives

useful	29	37	21	10	0	3	0	useless
confusing	0	3	5	5	39	27	21	clear
orderly	27	27	34	5	8	0	0	chaotic
incomplete	0	0	8	3	33	38	16	complete
convenient	16	43	24	3	10	3	0	inconvenient
complex	3	10	13	18	31	18	5	simple

3. Classifying Educational Research Studies

useful	64	21	14	0	0	0	0	useless
confusing	4	7	0	7	11	29	42	clear
orderly	54	29	7	11	0	0	0	chaotic
incomplete	0	0	0	4	19	37	41	complete
convenient	42	29	14	7	4	0	4	inconvenient
complex	0	7	21	14	18	14	25	simple

4. Interpreting Research

useful	47	42	9	2	0	0	0	useless
confusing	0	1	2	8	11	37	37	clear
orderly	44	40	13	1	0	1	0	chaotic
incomplete	0	2	1	13	9	55	20	complete
convenient	40	35	13	2	1	2	7	inconvenient
complex	1	6	9	36	17	28	3	simple

5. Improved Educational Programs

useful	24	46	14	13	1	1	1	useless
confusing	0	4	3	12	17	37	27	clear
orderly	33	37	18	8	1	2	1	chaotic
incomplete	11	16	6	16	15	22	15	complete
convenient	28	38	11	19	2	0	1	inconvenient
complex	0	30	11	19	22	28	12	simple

6. Types of Instructional Materials

useful	28	31	20	11	8	1	0	useless
confusing	1	2	4	13	14	33	33	clear
orderly	30	33	20	14	2	1	0	chaotic
incomplete	0	10	4	19	19	33	16	complete
convenient	34	18	23	21	4	0	0	inconvenient
complex	0	10	5	31	19	18	17	simple

7. Defining Instructional Specifications

useful	18	22	30	20	4	6	0	useless
confusing	4	2	13	25	26	11	13	clear
orderly	10	47	18	16	4	4	0	chaotic
incomplete	2	2	8	18	29	24	16	complete
convenient	17	20	20	26	4	11	2	inconvenient
complex	8	14	24	22	22	6	2	simple

8. Management of Behavioral Consequences

useful	31	31	21	10	7	2	2	useless
confusing	3	5	3	11	15	40	23	clear
orderly	25	35	15	17	2	7	0	chaotic
incomplete	21	40	11	19	2	5	2	complete
convenient	2	3	5	15	22	32	22	inconvenient
complex	5	5	11	31	21	19	8	simple

9. Measurement of Educational Outcomes

useful	33	16	21	16	13	0	0	useless
confusing	4	8	4	8	21	13	42	clear
orderly	33	16	33	8	4	0	4	chaotic
incomplete	4	0	0	8	38	33	16	complete
convenient	16	38	13	16	13	4	0	inconvenient
complex	0	0	8	21	38	16	16	simple

10. Absolute vs Relative Criteria

useful	38	26	13	13	0	13	0	useless
confusing	0	0	0	13	0	50	38	clear
orderly	38	38	26	0	0	0	0	chaotic
incomplete	0	0	0	26	0	63	13	complete
convenient	38	13	38	0	0	13	0	inconvenient
complex	0	0	0	0	0	38	63	simple

11. Construction of Prototype Items

useful	31	31	17	8	6	8	0	useless
confusing	0	3	8	16	5	32	35	clear
orderly	28	28	22	17	3	3	0	chaotic
incomplete	0	0	5	19	19	33	22	complete
convenient	16	39	11	16	8	8	0	inconvenient
complex	0	3	14	25	19	11	28	simple

12. Educational Criterion Measures

useful	32	26	25	10	4	1	1	useless
confusing	3	6	12	18	28	31	18	clear
orderly	24	36	20	11	7	4	0	chaotic
incomplete	3	3	5	17	19	34	19	complete
convenient	22	30	30	10	3	4	1	inconvenient
complex	1	8	7	32	10	30	11	simple

13. Threats to the Validity of a Study

useful	58	19	11	11	0	0	0	useless
confusing	4	11	7	21	14	30	13	clear
orderly	25	29	20	14	10	2	0	chaotic
incomplete	0	2	8	13	11	38	28	complete
convenient	30	26	19	8	8	8	2	inconvenient
complex	17	17	22	28	6	7	4	simple

14. Minimizing Threats to the Validity of a Study

useful	47	25	13	9	2	4	0	useless
confusing	9	8	25	30	11	8	9	clear
orderly	13	23	25	21	13	4	2	chaotic
incomplete	0	8	10	21	10	29	23	complete
convenient	10	27	25	17	8	12	2	inconvenient
complex	28	21	26	13	6	0	6	simple

15. Design Paradigms and Procedures

useful	50	36	10	5	0	0	0	useless
confusing	12	15	12	15	20	17	10	clear
orderly	30	38	18	8	5	3	0	chaotic
incomplete	5	0	2	14	5	36	38	complete
convenient	22	24	20	12	10	7	5	inconvenient
complex	29	17	19	19	10	5	2	simple

16. Use of Library Computer Programs

useful	62	20	15	2	0	0	2	useless
confusing	0	0	0	4	12	23	63	clear
orderly	25	13	4	4	8	6	40	chaotic
incomplete	0	4	0	6	15	42	32	complete
convenient	52	25	12	4	0	6	2	inconvenient
complex	0	2	8	25	12	29	25	simple

17. Choosing an Appropriate Statistical Procedure

useful	30	26	15	13	13	2	0	useless
confusing	15	13	17	11	15	20	9	clear
orderly	13	23	15	26	6	13	4	chaotic
incomplete	7	11	9	28	13	15	17	complete
convenient	14	30	9	21	2	7	16	inconvenient
complex	9	2	27	41	14	5	2	simple

18. Analyzing Variability

useful	35	23	20	10	5	8	0	useless
confusing	28	8	18	20	18	10	0	clear
orderly	8	15	23	23	5	23	5	chaotic
incomplete	10	2	10	30	7	22	20	complete
convenient	8	16	24	19	3	11	19	inconvenient
complex	31	24	22	15	5	2	0	simple

19. A Factorial Model: Rules of Thumb for the ANOVA

useful	11	16	16	37	11	5	5	useless
confusing	20	15	25	25	5	10	0	clear
orderly	21	21	5	32	11	11	0	chaotic
incomplete	5	0	5	21	0	58	11	complete
convenient	5	16	5	26	5	26	16	inconvenient
complex	35	35	11	20	0	0	0	simple

20. Formulating the Research Proposal

useful	41	31	24	9	4	0	0	useless
confusing	0	3	7	3	19	40	28	clear
orderly	23	45	15	8	8	2	0	chaotic
incomplete	0	0	10	22	18	35	15	complete
convenient	23	42	11	15	6	4	0	inconvenient
complex	2	6	13	28	17	28	7	simple

21. Components of the Research Proposal

useful	56	20	18	4	0	0	2	useless
confusing	0	6	6	6	17	36	30	clear
orderly	33	39	22	4	0	2	0	chaotic
incomplete	2	11	7	14	18	45	2	complete
convenient	33	30	24	9	0	4	0	inconvenient
complex	0	0	9	48	22	13	7	simple

22. The Research Report

useful	53	33	6	5	2	0	2	useless
confusing	0	3	5	10	10	38	35	clear
orderly	38	31	14	11	0	3	3	chaotic
incomplete	34	30	14	17	2	2	2	complete
convenient	0	2	2	13	8	34	42	inconvenient
complex	3	3	9	31	19	27	8	simple

Appendix D

RESPONSES TO THE 1967 SUMMER INSTITUTE PARTICIPANTS

FOLLOW-UP QUESTIONNAIRE

Three summer institutes were held in Los Angeles, Philadelphia, and St. Louis in cooperation with Southwest Regional Laboratory, Research For Better Schools, and Central Midwestern Regional Educational Laboratory. On December 4, 1967 all participants were mailed a follow-up questionnaire. The following are the results of the returned questionnaires.

	Los Angeles	Phila-delphia	St. Louis	Total	Percent
Number of participants	31	29	26	86	
Number of questionnaires returned to date	23	21	14	58	
Percentage of total questionnaires returned	74%	72%	54%	67%	

1. How many hours a week were you engaged in research and/or evaluation activities last year?

0	3	8	3	14	24
1 - 5	13	5	9	27	47
6 - 10	1	1	1	3	5
11 - 20	3	2	0	5	9
21 - 30	1	1	1	3	5
31 - 40	2	3	0	5	9
Omit	0	1	0	1	2

	Los Angeles	Phila-delphia	St. Louis	Total	Percent
2. How many hours a week are you currently engaged in research and/or evaluation activities?					
0	0	1	1	2	3
1 - 5	7	1	3	11	19
6 - 10	4	3	8	15	26
11 - 20	4	3	1	8	14
21 - 30	4	0	1	5	9
31 - 40	4	12	0	16	28
Omit	0	1	0	1	2
3. What is the nature of these activities?					
Reviewing others' projects for funding purposes.	8	3	3	14	14
Formulating research projects which others carry out.	6	4	4	14	14
Carrying out a preplanned project.	3	0	6	9	9
Carrying out original research projects.	9	6	1	16	16
Analyzing data from a preplanned project.	3	2	4	9	9
Supervising others' projects.	4	4	2	10	10
Conducting curriculum evaluation projects.	10	11	6	27	27

	Los Angeles	Phila-delphia	St. Louis	Total	Percent
Write-in responses:					
Survey and Administrative research	0	2	0	2	2
Evaluating Title I ESEA	0	0	1	1	1
Testing and test interpretation	0	0	1	1	1
Omit	0	3	1	4	4
4. Has the research proposal that you worked on during the Institute been completed?					
Yes	7	2	5	14	24
No	16	12	7	35	60
Omit	0	7	2	9	16
5. Has it been funded?					
Yes	7	2	5	14	24
No	16	12	7	35	60
Omit	0	7	2	9	16
6. If so, by whom?					
Government agency	3	0	3	6	10
State agency	1	1	0	2	3
Supervisor	0	0	1	1	2
District	2	1	1	4	7
Other:					
Phi Delta Kappa	1	0	0	1	2
Rosenburg Foundation	1	0	0	1	2
Omit	15	19	9	43	74

	Los Angeles	Phila-delphia	St. Louis	Total	Percent
7. Check the highest stage of progress of your project.					
a. Discovering potential research problems	1	0	1	2	3
b. Reviewing current practices and relevant research	3	0	3	6	10
c. Preparing the research proposal	3	3	2	8	14
d. Developing experimental materials	2	4	1	7	12
e. Collecting data in the schools	6	3	2	11	19
f. Analyzing data	3	1	2	6	10
g. Preparing report and making recommendations	1	0	0	1	2
h. Implementing changes consistent with recommendations	0	0	0	0	0
i. Initiating follow-up study	0	0	0	0	0
j. Preparing final report	0	0	0	0	0
Write-in Responses:					
k. Proposal rejected as illegal	1	0	0	1	2
Omit	3	10	3	16	28
8. To what extent do you feel prepared to conduct this project?					
Well prepared	10	5	4	19	33
Moderately prepared	11	9	8	28	48
Inadequately prepared	0	0	0	0	0
Omit	2	7	2	11	19

	Los Angeles	Phila-delphia	St. Louis	Total	Percent
9. How useful have you found the following Institute materials?					
behavioral objectives					
frequently used	12	13	5	30	52
occasionally used	9	4	6	19	33
rarely or never used	0	2	2	4	7
Omit	2	2	1	5	9
experimental design					
frequently used	10	5	2	17	29
occasionally used	9	9	9	27	47
rarely or never used	2	2	2	6	10
Omit	2	5	1	8	14
types of studies and variables					
frequently used	6	7	4	17	29
occasionally used	10	8	8	26	45
rarely or never used	4	4	1	9	16
Omit	3	2	1	6	10
criterion measures					
frequently used	9	5	2	16	28
occasionally used	8	9	8	25	43
rarely or never used	3	4	3	10	17
Omit	3	3	1	7	12

	Los Angeles	Phila-delphia	St. Louis	Total	Percent
instructional specifications					
frequently used	5	3	3	11	19
occasionally used	10	7	5	22	38
rarely or never used	4	6	5	15	26
Omit	4	5	1	10	17
choosing statistical procedures					
frequently used	8	4	0	12	20
occasionally used	8	5	8	21	36
rarely or never used	5	5	5	15	26
Omit	2	7	1	10	17
research report					
frequently used	9	5	5	19	33
occasionally used	8	9	6	23	40
rarely or never used	3	3	2	8	14
Omit	3	4	1	8	14
validity threats					
frequently used	7	6	2	15	26
occasionally used	10	9	10	29	50
rarely or never used	4	3	1	8	14
Omit	2	3	1	6	10
management of behavioral consequences					
frequently used	6	1	3	10	17
occasionally used	10	11	5	26	45
rarely or never used	4	5	5	14	24
Omit	3	4	1	8	14

	Los Angeles	Phila-delphia	St. Louis	Total	Percent
research proposal					
frequently used	10	6	4	20	34
ocasionally used	7	7	7	21	36
rarely or never used	2	5	2	9	16
Omit	4	3	1	8	14
analysis of variance					
frequently used	1	1	0	2	3
occasionally used	9	10	6	25	43
rarely or never used	6	5	6	17	29
Omit	7	5	2	14	24

Questions 10 and 11 are at the end of this questionnaire

12. How much are Institute materials assisting you with your activities?					
very much	16	14	7	37	64
some	7	5	6	18	31
none at all	0	0	0	0	0
Omit	0	2	1	3	5
13. What is your research budget for the current year?					
0	5	8	3	16	28
100 - 500	0	0	0	0	0
501 - 1000	2	0	2	4	7
1000 - 5000	4	0	1	5	9
above 5000	9	7	4	20	34
Omit	3	6	4	13	22

	Los Angeles	Phila-delphia	St. Louis	Total	Percent
14. What was your research budget for the previous year?					
0	10	8	4	22	38
100 - 500	1	0	1	2	3
501 - 1000	0	0	3	3	5
1001 - 5000	3	0	0	3	5
above 5000	5	7	3	15	26
Omit	4	6	3	13	22
15. Have you changed positions since you attended the Institute?					
Yes	6	7	0	13	22
No	17	12	14	43	74
Omit	0	2	0	2	3
16. Was your attendance at the Institute instrumental to your changing positions?					
Yes	4	6	0	10	17
No	11	5	1	17	29
Omit	8	10	13	31	53

10. In dealing with your project have you come across activities that profitably could have greater emphasis in the Institute materials? If so, please describe below.

Los Angeles: (Most often mentioned)

1. Statistical Procedures
2. More practical exercises
3. Behavioral objectives
4. How to sell a proposal
5. Use of consultants in preparing research proposal

Philadelphia: (Most often mentioned)

1. Use of a computer programs
2. Writing the Research Report
3. Behavioral objectives
4. Construction of survey and questionnaire instrument
5. Statistical procedures
6. Proposal preparation

St. Louis: (Most often mentioned)

1. Defining the research problem
2. Writing the research report
3. Analyzing variability
4. Development of criterion measures

11. Are there any areas in your present job for which you feel you could use some instructional materials, not presented in the Summer Institute? Please list areas in space below.

Los Angeles:

1. Task analysis procedures
2. The use of computers in education
3. Measuring objectives in the affective domain
4. Evaluating behavioral objectives
5. Product development procedures

Philadelphia:

1. Constructing questionnaires
2. Pupil-teacher interaction and observation techniques
3. Advanced design and statistics
4. The use of computers in education
5. Psychometric techniques

St. Louis:

1. Library research techniques
2. Advanced design and statistics
3. Constructing curriculum objectives
4. Research technique for the classroom teacher

APPENDIX E

Summer Research Institute Participants
Philadelphia, Pennsylvania

DELAWARE

Jane B. Laskaris
Research Assistant
University of Delaware

FLORIDA

Arthur E. Cohen
Specialist, Research and Information
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Dade County Florida

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NEW YORK

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Board of Education
Middletown, New York

OHIO

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Personnel and Research
Board of Education

PENNSYLVANIA

John A. Cannon
Teacher
Archdiocese of Philadelphia

Michelle M. Chaplin
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Jeffrey C. Douville
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Leonard E. Glassner
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PENNSYLVANIA (continued)

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Margaret L. Havard
Research Intern
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Gladys F. Jones
Research Assistant
Prekindergarten Program
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Erma D. Keyes
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R. Lewis Rofman
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Jay Smink
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Coordinating Unit for
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Harold T. Smith
Director, Secondary Curriculum
School District City of Chester

Alan H. Solomon
Teacher
School District of Philadelphia

Elliott D. Waters
Sixth Grade Teacher
Board of Education

Grace J. Weeks
Supervisor in Research
School District of Philadelphia

Edward N. Whitney
Evaluation Coordinator
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George R. Young
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VIRGINIA

Kathryn J. Ripley
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Northern Virginia Community College

Summer Research Institute Participants
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ARIZONA

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District #1

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Douglas Public Schools

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Research and Planning
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Director of Elementary Education
Scottsdale Elementary School
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Sister Jean Ann Wilburn
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Marilyn Burns
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Research and Evaluation Analyst
Los Angeles City School District
ESEA, Title III

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Buena Park School District

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Beverly Hills Unified School District

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Principal, San Altos School
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Newhall School District

Jack R. Walker
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ESEA, Title III
San Bernardino County Superintendent of Schools

Yvonne C. Watkins
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John F. Mudge, Superintendent

Everett Waxman
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NEVADA

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Sharon Y. Pearson
Technical Writer
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Weldon Kendrick
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Fairfield Community High School
District #225

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District #9

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Education

William B. Fisher, Jr.
Principal of Adult Education and
Teacher
Jefferson County Board of Education

Cletus L. Hubbs, Jr.
High School Principal
Hopkinsville Board of Education

C. Hillman McIntire
Psychometrist
Owensboro City Schools

William E. Robinson
Superintendent of Schools
Carter County

Elisabeth J. Tate
Instructional Materials Supervisor
Green County

LOUISIANA

James W. Gardner
Assistant Director, ESEA
Supervisor of Testing and Evaluation
Acadia Parish School Board

MISSOURI

Russell R. Bastian
Principal, Craig Elementary
Parkway District

Elmer Belsha
Assistant Superintendent
School District of Jennings

Quincy C. Dickey
Principal, Elementary School
Berkeley School District

MISSOURI (continued)

Brother Robert J. Godfrey
Assistant Superintendent
Catholic Archdiocese of St. Louis

Walter D. Grigsby
Curriculum Director
St. Charles Public Schools

Herschel L. Neil
Principal
Parkway School District

John H. Ross
Assistant Superintendent of Schools
Knox County School District R-I

Sister Mary Noreen Corkery, R.S.M.
Diocesan and Community Supervisor (Elementary)
Superintendent of Catholic Schools

Mansfield D. Neely, Sr.
Regional Supervisor, Elementary
Associate Director NEIP
(Ford Foundation)

James J. Webb
Principal, Elementary
Overton County Board of Education

J. B. Whitman
Superintendent of Schools
Robertson County

TENNESSEE

Joe W. Clark
Principal
Humboldt City Board of Education